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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,604	10/19/2001	Chenjing Fernando	10010654-1	3020

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EXAMINER	
LAY, MICHELLE K	
ART UNIT	**PAPER NUMBER**
2672	

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/027,604	FERNANDO, CHENJING	
	Examiner	Art Unit	
	Michelle K. Lay	2672	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-9 and 11-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-9 and 11-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

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DETAILED ACTION

Response to Amendment

The amendment filed on 01/17/2006, has been entered and made of record. Claims 1, 2, 4-9, and 11-16 are pending.

Response to Arguments

Applicant's arguments filed 01/17/2006 have been fully considered but they are not persuasive. Applicant argues calculating the bit period based on the zero space is not equivalent to calculating bit period from "three consecutive zero crossings". Applicant provides Figure A as an explanation of the difference. However, claim 1 recites the limitation of *sampling the input signal*, on line 3. Thus, if the sampled line is what Figure A depicts, the zero space can not only be P1 and P2 as Applicant defines, but rather the portion near X3 where the signal is the threshold, P1, the portion prior to P2 that is below the threshold, and P2. From the definition of a zero space as provided in the specification, it can be properly concluded from a person of ordinary skill in the art that the negative values of the sinusoidal wave, as defined by a high-to-low crossing of a threshold and then a consecutive low-to-high crossing of the threshold, defines a zero space. Furthermore, due to the well-known nature of sinusoidal signals, the period can be determined from the beginning of one zero space to another, i.e. three consecutive crossings of the threshold, as the prior art teaches.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims **1**, **4-8**, and **11-16** are rejected under 35 U.S.C. 1O3(a) as being unpatentable over Miller (US Patent No. 6,311,138) in view of D'Albora (US Patent No. 4,114,136) in view of Wiggers (US Patent No. 5,397,981) in further view of Norton (US Patent No. 4,592,077).

In regards to claim **1**, Miller teaches a digital oscilloscope, which specifically is an apparatus for executing a method of displaying an input signal [col. 5, lines 8-20; Fig. 1].

Miller also teaches digitizing the input signal, which specifically is sampling the input signal [col. 3, lines 36-45, 54-56].

Miller additionally teaches making primary measurements of a signal, wherein the signal's voltage is measured over time. Said primary measurements are compared against a threshold to determine the time over which the primary measurement falls below or rises above a threshold as a function of time [col. 2, line 54 – col. 3, line 10; col. 5, Lines 55-58; Fig. 3 (122, 122')]. According to the applicant, ***making a comparison to a threshold voltage value at appropriate time points identifies a zero space pattern***. Thus, said searching for the time, wherein data points fall below the threshold specifically is ***searching for a zero space pattern in the sampled***

signal. The first set of data points from the primary measurements, which is determined to fall below the threshold specifically is ***locating a first zero space***. The second set of data points from the primary measurements, which is determined to fall below the threshold specifically is ***Locating a second zero space***. The sine wave shown on Fig. 3 specifically shows a plurality of ***zero spaces*** that occur continuously.

Miller further teaches identifying the cycles of the waveform by analyzing the primary measurements, wherein the ***periods*** of successive cycles are calculated from said identification of the cycles [col. 6, lines 33-60].

Miller also teaches zoom and scan functions when displaying the input signal along with the period data, which specifically is ***displaying the input signal using the calculated bit period as the basis for a scale*** [col. 9, Lines 16-26].

Miller also teaches calculating cycle parameters comprising the time between maxima and minima for each cycle and the time between minima and previous minima for each cycle, which specifically is calculating the period. Although calculating the time between two consecutive minima specifically is calculating the time between the mid points of ***the first zero space and the second zero space***, Miller does not explicitly teach ***calculating bit period of the input signal by determining the time period between the first zero space and the second zero space wherein each of the zero spaces is a period of time with no signal value above a threshold.***

The invention of D'Albora discloses a processor for the quick measurement of statistically significant variations of the characteristics of a signal in the presence of noise. Specifically, the time period of a signal is described as one of the signal wave

parameters measured by the processor. Column 2, 62-67, and Column 3, Lines 1-5, teaches of measuring the time interval between zero crossings of a signal with which to determine the time period of the signal. Column 3, lines 1-5, states, "The wave processors 32 and 3 may consist of a zero crossing detector (either upward or downward going zero crossing) which triggers a counter on and off at successive zero crossings, or after n zero crossings." Thus, D'Albora teaches of determining the time period between zero crossings wherein the crossings are described as instances where a signal either upwardly or downwardly crosses a zero threshold. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Miller to include determining the zero spaces as instances where the signal either upwardly or downwardly crosses a zero threshold as in D'Albora. It is well known in the art that electrical signals are susceptible to jitter, thus making it difficult to determine when a signal is at a specific value. By determining the zero spaces at points when the signal crosses a zero threshold instead of merely where the signal lands on a zero threshold, the effects of unwanted jitter may be reduced such that during instances where the offsets introduced by jitter may be enough to cause the signal to reach a zero threshold, a threshold crossing will still not be determined to have occurred since the threshold was only reached and not crossed. Therefore, one would have been motivated to make such a modification to Miller so that the measured time period of an input signal is accurate despite the introduction of jitter to the signal.

Wiggers teaches a digital storage oscilloscope having automatic time base [col. 3, Lines 40-57; col. 6, Lines 53-57; Fig. 1), wherein the input signal is automatically

analyzed in order to display the input signal with desired time base. The input signal is analyzed, wherein the amplitude value of each sample is compared to a reference threshold, and three consecutive zero crossings calculated. Then the period is calculated as the time between the first and the third crossings, which specifically is ***calculating bit period of the input signal by determining the time period between the first zero space and the second zero space*** [col. 6, Line 41 – col. 7, Line 32]. In addition, said input signal is displayed based on the calculated period having set time base, which specifically is ***displaying the input signal using the calculated bit period as the basis for a scale***. It would have been obvious to one of ordinary skill in the art to take the teachings of Miller in view of D'Albora, and to add from Wiggers the automatic time base mode in order to automatically display the input signal having desired time base. The automatic time base mode allows the oscilloscope to display input signals over a wide range of frequencies and to maintain a fixed display despite changes in signal frequencies. In addition, both references are directed to a digital storage oscilloscope.

Miller, D'Albora, and Wiggers teach the method of displaying an input signal as applied to claim 1 above, but do not explicitly teach determining whether NRZ autoscale is applicable.

Norton teaches the said limitation:

- NRZ digital data may be modulated by integrating the received signal for the bit period [col. 1, lines 20-22].

- Detecting each transition across the reference axis made by the received NRZ digital data stream [col. 1, lines 43-44]. The determined bit period is then used to autoscale the NRZ data.
- The applicant also discloses that techniques for autoscaling NRZ modulated signals already exist. See the following:

"As for determining the bit period to autoscale the X-axis, techniques exist to determine the bit period for NRZ modulated input signal...such techniques for autoscaling the NRZ modulated signal" [paragraph 4, Lines 7-12].

It would have been obvious to one of ordinary skill in the art to take the teachings of Miller, D'Albora, and Wiggers, and to add from Norton, the ***NRZ autoscale*** in order to determine if the input signal is NRZ encoded and to accurately scale the NRZ encoded signal. Norton's teachings provide method and apparatus for generating a clock signal, which is synchronized with the received NRZ data in order to properly demodulate the NRZ digital data. The clock signal must be synchronized with the received NRZ in order to integrate at the correct time and thus avoid excess error rate.

In regards to claim **4**, Miller, as modified by D'Albora and Wiggers, discloses ***the method recited in claim 1 wherein the step of locating the first zero space comprises: Locating a first transition, X_1, where value of the input signal is more than the threshold value, V_{THRES}, before the first transition, X_1, but less than the threshold value, V_{THRES}, after the first transition X_1, the first transition, X_1, being the first such transition following the offset; and Locating a second transition X_2,***

where value of the input signal is less than the threshold value, V_{THRES}, before the second transition, X_2, but more than the threshold value, V_{THRES}, after the second transition, X_2, the second transition, V_2, being the first such transition following the first transition, X_1.

- Miller teaches calculating the time that the signal falls below the threshold TH. The time that the signal falls below the threshold is bounded by two consecutive signal transitions across the threshold beginning with a falling phase and ending with a rising phase, and it reads on the applicant's disclosure of the first zero space [col. 5, Lines 55-58; Fig. 3 (122, 122')].
- Wiggers also teaches locating ***the first zero space*** [Fig. 3 (102)].

In regards to claim **5**, Miller, as modified by D'Albora and Wiggers, teaches ***the method recited in claim 4 wherein the step of Locating the second zero space comprises: locating a third transition, X_3, where value of the input signal is more than the threshold value, V_{THRES}, before the third transition, X_3, but less than the threshold value, V_{THRES}, after the third transition, X_3, the third transition, X_3, being the first such transition following the second transition X_2; and Locating a fourth transition X_4, where value of the input signal is less than the threshold value, V_{THRES}, before the fourth transition, X_4, but more than the threshold value, V_{THRES}, after the fourth transition, X_4, the fourth transition, X_4, being the first such transition following the third transition, X_3.***

- The same basis and rationale for claim rejection as applied to claim 4 above are applied. In addition, Fig. 3 of Miller illustrates consecutive ***zero spaces*** which satisfies the Limitation of ***the second zero space***.
- Further, Wiggers teaches calculating one zero crossing for each cycle of the input signal waveform as applied to claim 4 above, and thus the zero crossing calculated from ***the second cycle specifically is the second zero space***.

In regards to claim **6**, Miller, as modified by D'Albora and Wiggers, teaches ***the method recited in claim 5 wherein the step of calculating the bit period comprises determining temporal difference between the third transition, X_3, and the first transition X_1.***

- Fig. 5 of Miller illustrates the period of the input signal and reads on the current claim: ***temporal difference between the third transition and the first transition*** [col. 6, Lines 21-31; Fig. 5 (122')].
- In addition, Wiggers clearly teaches the said Limitation of calculating the bit period as applied to claims 1 and 4-5.

In regards to claim **7**, Miller, as modified by D'Albora and Wiggers, teaches ***the method recited in claim 1 further comprising displaying the input signal using a multiple of the calculated bit period as the scale*** as applied to claim 1 above.

In regards to claim **8**, the same basis and rationale for claim rejection as applied to claim 1 are applied. In addition, Miller teaches ***an apparatus for displaying an input signal, the apparatus comprising a processor.***

- Miller teaches a central processing unit (CPU), which controls the overall operation of the oscilloscope [col. 8, lines 26-27; Fig. 12 (150)]. Miller, as modified by D'Albora and Wiggers, teaches of ***storage connected to the processor, the storage including instructions for the processor to*** perform the methods as applied to claim 1 above.
- Miller teaches data captured in the waveform memories of the channels are transferred by the CPU into slots in a local memory via bus, which specifically is ***storage connected to the processor*** [col. 8, lines 27-30]. The central processing unit (CPU) controls the overall operation of the oscilloscope, which specifically is executing instructions for the processor to perform said method as applied to claim 1 above [col. 8, Lines 26-27; Fig. 12 (150)].
- Wiggers teaches a CPU, which operates according to the stored program instructions and operator selected control input [col. 4, line 53 – col. 5, line 12].
- Norton teaches ***NRZ autoscale***. It would have been obvious to one of ordinary skill in the art to use the stored instruction to allow the CPU to perform ***NRZ autoscale***. It would have been obvious still to take the teachings of Miller, D'Albora, and Wiggers and to add the ***NRZ autoscale*** in

order to implement a computerized oscilloscope-type apparatus capable of automatically determining if the input signal is NRZ encoded and to accurately scale the NRZ encoded signal.

In regards to claim **11**, the same basis and rationale for claim rejection as applied to claims 4 and 8 is applied.

In regards to claim **12**, the same basis and rationale for claim rejection as applied to claims 5 and 8 is applied.

In regards to claim **13**, the same basis and rationale for claim rejection as applied to claims 6 and 8 is applied.

In regards to claim **14**, the same basis and rationale for claim rejection as applied to claims 7 and 8 is applied.

In regards to claim **15**, the same basis and rationale for claim rejection as applied to claim 8 is applied.

In regards to claim **16**, the same basis and rationale for claim rejection as applied to claim 15 is applied.

In addition, Miller, as modified by D'Albora, Wiggers and Norton, teaches that ***the medium is selected from a group consisting of magnetic disc, optical disc, read only memory (ROM), random access memory (RAM), hard drive, compact disc (CD), flash memory, and solid state memory.***

- Miller teaches the central processing unit (CPU) as applied to claim 8 and 15 above, which controls the overall operation of the oscilloscope [col. 8, Lines 26-27; Fig. 12 (150)]. Data captured in the waveform memories of the channels are transferred by the CPU into slots in a local memory via bus [col. 8, Lines 27-30]. The phrase ***selected from a group consisting of*** implies that only one of the mediums listed is required, and the claim is drafted as a Markush group. Miller's teaching of the local memory satisfies the definition of at least one of the group ***Magnetic disc, optical disc, ROM, RAM, hard drive, CD, flash memory, and solid state memory,*** which is specifically at least a "***ROM***", a "***RAM***" or a "***solid state memory***".
- Wiggers teach the Limitation of main acquisition random access memory (RAM) connected to the CPU, which specifically is at least a RAM [col. 4, Lines 53 – col. 5, Line 12].

2. Claims **2** and **9** are rejected under 35 U.S.C. 1O3(a) as being unpatentable over Miller (US Patent No. 6,311,138) in view of D'Albora (US Patent No. 4,114,136) in view of Wiggers (US Patent No. 5,397,981) in view of Norton (US Patent No. 4,592,077) as

applied to claims 1, 4-8, and 11-16 above and in further view of Gauland et al. (US Patent No. 6,571,185).

In regards to claim **2**, Miller in view of D'Albora, Wiggers, and Norton teach the method of displaying an input signal as applied to claim 1 above, but do not explicitly teach initializing offset and time scale though these are standard steps in the display of waveforms on the digital oscilloscope.

Gauland et al. teaches the said Limitation.

- A setup, which specifically is used to ***initialize*** the signal, may include horizontal timebase settings, which specifically is ***time scale***, vertical amplitude multiplication factor (amplification/attenuation) settings, vertical signal offset settings, trigger condition settings, and display persistence and brightness settings [col. 8, Lines 59-63].

It would have been obvious to one of ordinary skill in the art to take the teachings of Miller, D'Albora, Wiggers, and Norton and to add from Gauland et al. method of ***initializing offset and time scale*** in order to establish an accurate baseline of the input signal which leads to accurate measurements of appropriate parameters such as the ***zero space*** and the ***bit period*** used in displaying the input signal because of the conventionality of these initialization processes and because if these initialization steps are not performed, the display may not be accurate. Also, all references are directed to displaying an input signal using a digital oscilloscope.

In regards to claim **9**, the same basis and rationale for claim rejection as applied to claims 2 and 8 are applied.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle K. Lay whose telephone number is (571) 272-7661. The examiner can normally be reached on Monday-Thursday from 7:30am to 5:00pm. The examiner can also be reached on alternate Fridays from 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe, can be reached on (571) 272-7691. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michelle K. Lay
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02.14.2006 mkl

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